Best Management Practices for ARNG Operational Ranges

Bonnie Packer
ORA Project Manager (ARNG ILE-C)
703-607-7977
DSN 327 - 7977
Bonnie.M.Packer.ctr@us.army.mil

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
01 DEC 2011		**00-00-2011 to 00-00-2011**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Best Management Practices for ARNG Operational Ranges	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Army National Guard (ARNG) Directorate ,ILE-C Support,111 South George Mason Drive,Arlington,VA,22204-1382	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

Presented at the Partners in Environmental Technology Technical Symposium & Workshop, 29 Nov ? 1 Dec 2011, Washington, DC. Sponsored by SERDP and ESTCP

14. ABSTRACT

The Army National Guard (ARNG) Directorate completes Phase II (quantitative) Operational Range Assessments at operational range complexes across the nation. The Department of Defense recently established the Operational Range Assessment requirement to ensure the longterm viability of operational ranges, while also protecting human health and the environment. The assessment determines whether a release?or substantial threat of a release?of munitions constituents from operational ranges to an off-range area creates an unacceptable risk to human health or the environment. One element of the work associated with these assessments is the delivery of a separate ?letter report? to and for the installation that outlines and describes specific actions the installation may take to mitigate potential releases of munitions constituents. These ?best management practices? for small arms ranges and other than small arms ranges include operational changes, vegetative solutions, storm water management, design and structural enhancements, soil amendments, and pollution prevention, and focused periodic removal. This talk will cover as many of these categories and specific solutions as time allows.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**22**	

BEST MANAGEMENT PRACTICES FOR ARMY NATIONAL GUARD OPERATIONAL RANGES

DR. BONNIE PACKER
ARNG Directorate, ILE-C Support
Arlington Hall Station
111 South George Mason Drive
Arlington, VA 22204-1382
(703) 607-7977
bonnie.m.packer.ctr@us.army.mil

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Agenda

- Background
- Technical Approach
- BMPs for Installation use at Operational Ranges

Operational Range Assessment Background

Program Drivers

- Part of the Army's Sustainable Range Program
- Department of Defense Directive 4715.11 (10 May 2004)

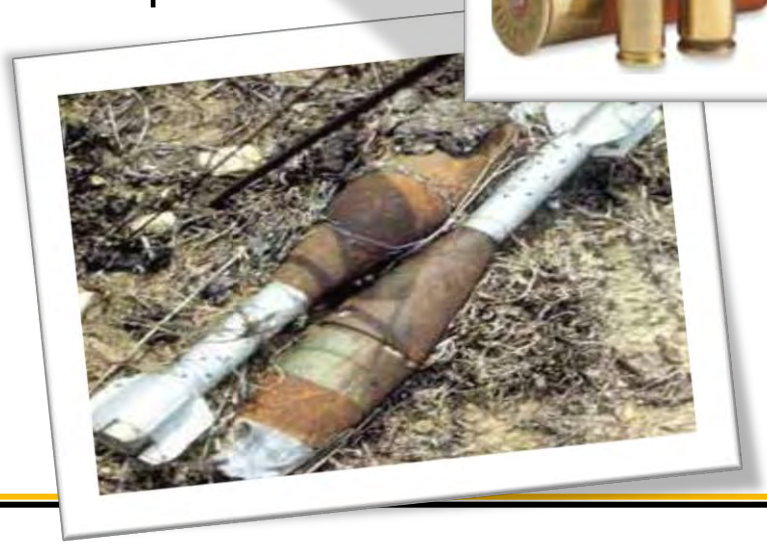
  "…Ensure the long-term viability of operational ranges while protecting human health and the environment."
- Department of Defense Instruction 4715.14 (30 Nov 2005)

  "… Determining whether a release or substantial threat of a release of munitions constituents of concern from an operational range to an off-range area creates an unacceptable risk to human health or the environment."

Operational Range Assessment Background (cont'd)

Munitions Constituents of Concern (MCOC)

- Small Arms
  - Lead
  - Antimony
  - Copper
  - Zinc
  - Tungsten
- Other
  - Perchlorate
- Explosives
  - HMX
  - RDX
  - TNT
  - White Phosphorus



Operational Range Assessment Background (cont'd)

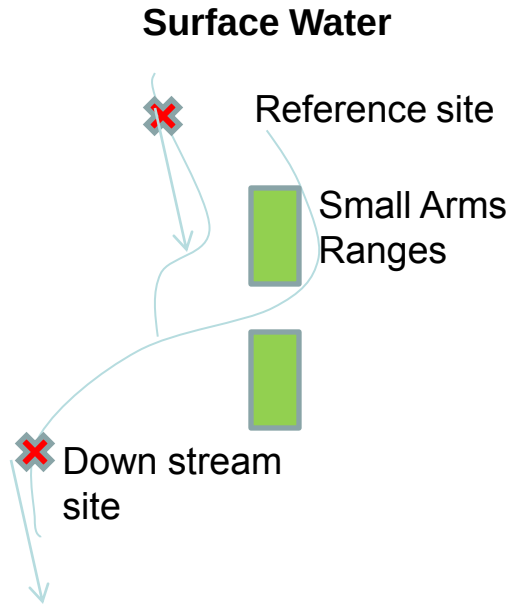
Program Phases

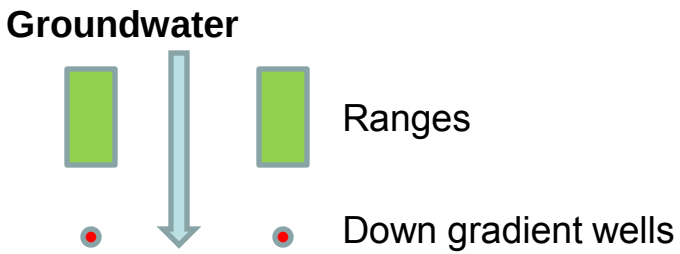
- **Phase I**: determine based upon available information:
  - **Unlikely**: site unlikely to have a release to a potential receptor
  - **Inconclusive**: insufficient information to make a determination
  - **Referred**: off range foot print area referred to appropriate clean up program
- **Phase II**: Gather data from Inconclusive areas (principally the pathways) to determine whether munitions constituents leave the range foot print at concentrations that may pose a risk to human health or the environment:
  - Unlikely: BMP letter reports for operational areas
  - Referred: off range foot print area referred to appropriate clean up program; BMPs letter reports for operational areas
- **Periodic Review**: All unlikely areas periodically reviewed to ensure no change to source, pathway and /or receptor
  - BMP letter reports for operational areas

Phase II ORA Technical Approach

Surface water, sediment, storm water & groundwater

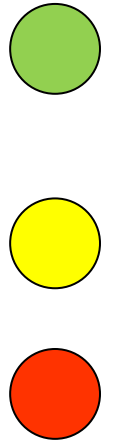
- Surface water: Sampled down stream and reference site
- Groundwater: sample down gradient & background where appropriate





Technical Approach- Outcomes

- Best Management Practices** (BMPs) currently working
- Recommend BMPs for specific areas
- Coordinate with appropriate authorities & recommend post-ORA evaluation & BMPs



- All installations undergo periodic review

***BMPs are mission critical*

Small Arms Ranges

- Storm Water Management/Erosion Control
- Vegetative Solutions
- Operational Strategies
- Range and Berm Design
- Soil Amendments
- Pollution Prevention
- MCOC Mass Control

Small Arms Ranges

Conceptual Model

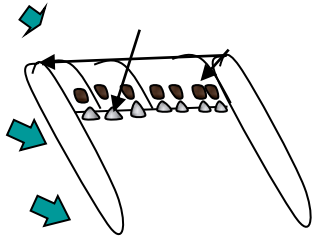
Small Arms Ranges

(Source: Army Small Arms Range BMP Manual)

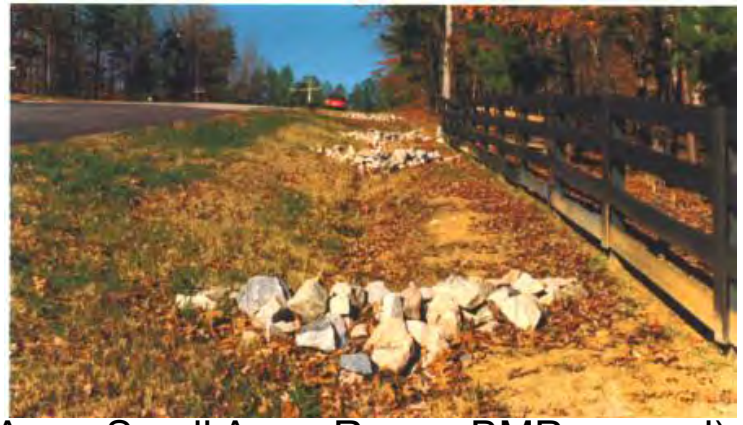
Small Arms Ranges

Storm water management/Erosion Control

- Land shaping/grading
- Diversion channels
- Check dams
- Channel stabilization
- Sand filters/ french drains
- Sediment barriers
- Dust control



Rip rap check dams along road



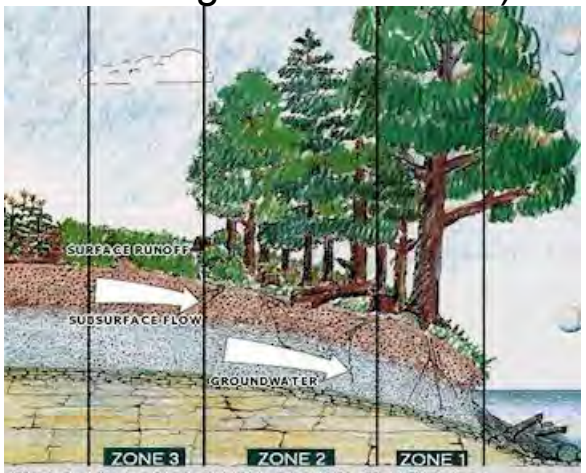
(Source: Army Small Arms Range BMP manual)

Small Arms Ranges

Vegetative Solutions

- Establish vegetative cover (wear tolerant vegetation guide for specific cultivar types)
  - Climate and soil specific, fire management, rhizomes & more
- Aerial seeding for inaccessible areas
- Grass in channels and swales
- Grass filter strips, manage mowing heights
- Riparian buffer zones
- Erosion control mats with vegetation

(Source: Army Small Arms Range BMP manual)



Sketch of a typical riparian forest buffer (Source: Chesapeake Bay Program, 2000)

Small Arms Ranges

Operational strategies

- Sustain vegetation/manage mowing heights
- Maintain range
- Distribute firing lane use
- Number of targets per frame (4 is not better)
- Minimize/eliminate firing into water
- Inspect BMPs

Small Arms Ranges

Range and Berm Design

- End berms to manage surface water; sdz
- 2:1 slope maximum for berm
- Materials: cohesive soil for berm core, but sandy front eases lead management
- Berm structural enhancements
- Range floor grading

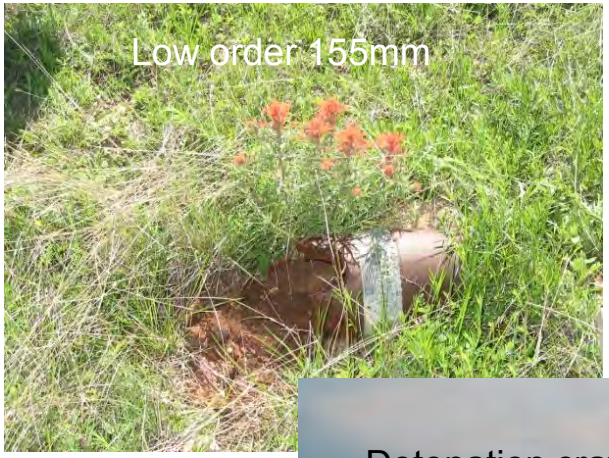
(Source: Army Small Arms Range BMP manual)

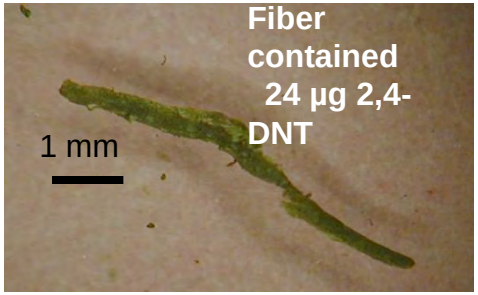
Berm 2:1 slope

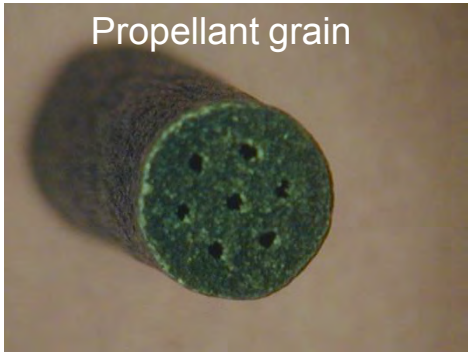
Small Arms Ranges

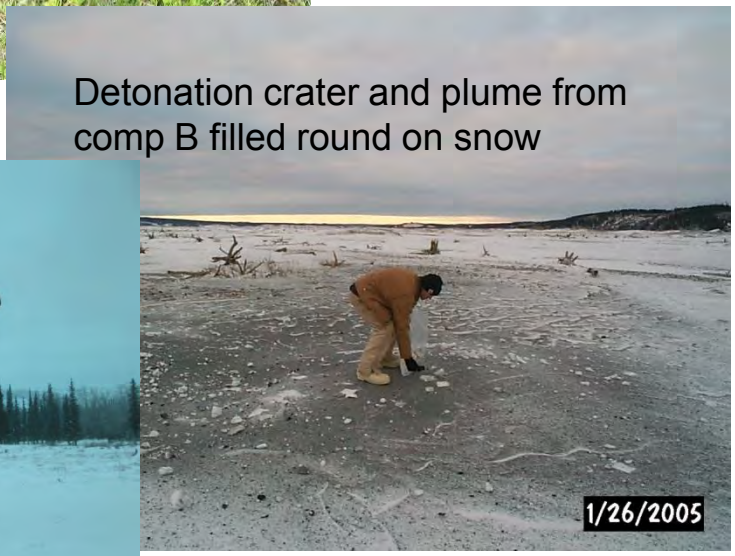
- Soil Amendments: maintain pH 6-8
- Pollution Prevention: green ammunition, picking up brass
- MCOC Mass Control: sift out lead from bullet pockets; if possible, don't push back berm

Other than Small Arms Ranges

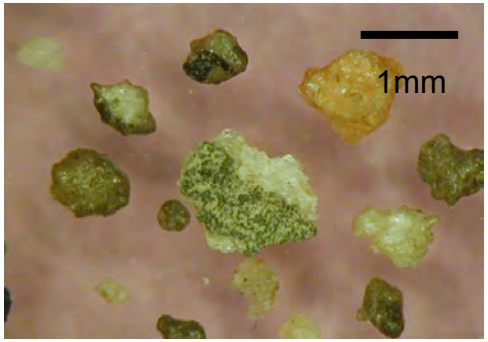








Comp B particles from low order



Photographs courtesy of ERDC-CRREL

Lime Treatment of HGR & OB/OD

Both have small areas conducive to treating HE with hydrated lime

- Increase pH to 11.5 for short period
- Ft. Jackson HGR used one ton of lime
- Mixing can be done by several methods
- Rain water rather than engineered addition of water
- Cost of lime ~$500- ~$1000 depends on area size/ soil

ERDC: Deborah Felt, Steve Larson, Andy Martin, Chris Griggs, Jared Johnson
ATC: Gene Fabian
ARA, Inc: Catherine Nestler.

ESTCP ER 0216 and ER 0742 Users Guides

Other than Small Arms Ranges

- Storm water management/erosion control- same as for small arms
- Environmentally compliant range designs: low water stream, tank turn pad, mover berm, defilade position

Other than Small Arms Ranges

Vegetation Solutions

- Wear tolerant vegetation guide: impact, maneuver, bivouac, cantonment areas
  - Arid Northwest
  - Northeast (in review)
- Aerial seeding for impact areas

Pollution prevention pyrotechnics: new simulators; pick up partially spent flares

Other than Small Arms Ranges

Operational strategies for impact areas

- Minimize rocky outcrop targets- they create low orders
- Minimize low order detonations, by munitions type
- Minimize firing into water
- Sustain vegetation
- Maintain range
- Inspect BMPs

(Photograph courtesy of Clif Youmans- MTARNG)

Questions?